

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A laser modulating and driving device comprising:  
a modulation signal generating unit provided in a first substrate and configured to generate and output a laser modulation signal consisting of a pair of symmetrical small swing differential signals based on pixel data, the pair of symmetrical small swing differential signals swinging between a predetermined high voltage and a predetermined low voltage, wherein

the predetermined high voltage is less than a supply voltage of a small swing differential signal output circuit of the modulation signal generating unit, and the predetermined low voltage is more than a ground voltage of the small swing differential signal output circuit and less than the predetermined high voltage, and

the modulation signal generating unit ~~including~~ includes a modulation circuit configured to produce a modulation signal and the small swing differential signal output circuit configured to convert the modulation signal to the pair of small swing differential signals,

the modulation signal generating unit has an output-stage inverter or buffer using a transistor, and

at least one of a high potential and a low potential that defines a swing of said pair of small swing differential signals is generated by an ON resistance of the transistor; and

a driving unit provided in a second substrate spatially separated and distinct from the first substrate and configured to drive a laser according to the laser modulation signal output and supplied from the modulation signal generating unit, the driving unit including a small swing differential signal input circuit configured to receive the pair of small swing differential signals.

Claim 2 (Canceled).

Claim 3 (Currently Amended): The laser modulating and driving device of claim [[2]] 1, wherein the small swing differential signal output circuit includes:

a non-inverted and inverted signal generating circuit configured to produce a non-inverted signal having the same phase as the modulation signal and an inverted signal with the phase shifted by 180 degrees from the modulation signal; and

a small swing output circuit configured to reduce swings of the non-inverted signal and the inverted signal to output said pair of small swing differential signals as the laser modulation signal.

Claim 4 (Original): The laser modulating and driving device of claim 3, wherein the small swing output circuit is formed as current mode logic (CML) or emitter coupled logic (ECL).

Claim 5 (Original): The laser modulating and driving device of claim 4, wherein a reference potential of the CML or ECL is a supply voltage VCC of the modulation signal generating unit.

Claim 6 (Original): The laser modulating and driving device of claim 4, wherein a reference potential of the CML or ECL is an intermediate potential lower than a supply voltage VCC of the modulation signal generating unit.

Claim 7 (Original): The laser modulating and driving device of claim 4, wherein the small swing differential signal output circuit further includes swing reducing means arranged

before the CML or ECL to decrease the swing of the non-inverted and inverted signals input to the CML or ECL.

Claim 8 (Currently Amended): The laser modulating and driving device of claim [[2]] 1, wherein the small swing differential signal output circuit has a first supply voltage, and the small swing differential signal input circuit has a second supply voltage different from the first supply voltage.

Claim 9 (Currently Amended): The laser modulating and driving device of claim [[2]] 1, wherein the small swing differential signal input circuit has a differential signaling circuit using transistors.

Claim 10 (Original): The laser modulating and driving device of claim 1, further comprising:

a signal transmission line configured to connect the modulation signal generating unit and the driving unit, through which said pair of small swing differential signals propagate; and

a first resistor that terminates said pair of small swing differential signals at an output end of the signal transmission line.

Claim 11 (Original): The laser modulating and driving device of claim 10, further comprising:

a second resistor connected parallel to the first resistor and arranged at an input end of the signal transmission line to couple said pair of small swing differential signals.

Claim 12 (Previously Presented): The laser modulating and driving device of claim 1, further comprising:

a signal transmission line for connecting the first and second substrates to transmit the laser modulation signal from the modulation signal generating unit to the driving unit.

Claim 13 (Original): The laser modulating and driving device of claim 12, further comprising:

a pixel data generating unit configured to supply the pixel data to the modulation signal generating unit, wherein the pixel data generating unit and the modulation signal generating unit are formed on the same board.

Claim 14 (Original): The laser modulating and driving device of claim 12, further comprising:

a pixel data generating unit configured to supply the pixel data to the modulation signal generating unit, wherein the pixel data generating unit and the modulation signal generating unit are formed as a single integrated circuit.

Claim 15 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has an output-stage inverter or buffer having a supply terminal, to which a first voltage lower than a supply voltage of the modulation signal generating unit is applied.

Claim 16 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has an output-stage inverter or buffer having a ground terminal, to which a second voltage higher than a ground voltage is applied.

Claim 17 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has an output-stage inverter or buffer having a supply terminal, to which a first voltage lower than a supply voltage of the modulation signal generating unit is applied, and a ground terminal, to which a second voltage higher than a ground voltage is applied.

Claim 18 (Canceled).

Claim 19 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has an output-stage inverter or buffer and a resistor connected in series with the output-stage inverter or buffer to reduce a swing of an output of the output-stage inverter or buffer.

Claim 20 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit is formed in a block spatially separated from the driving unit, and has an output-stage inverter or buffer and a resistor arranged outside the block to reduce a swing of an output of the output-stage inverter or buffer.

Claim 21 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has an output-stage inverter or buffer and a resistor connected to an output from the output-stage inverter or buffer to reduce a swing of the output from the output-stage inverter or buffer, and the driving unit has an input-stage differential signaling circuit using a transistor.

Claim 22 (Original): The laser modulating and driving device of claim 1, wherein the modulation signal generating unit has a first supply voltage, and the driving unit has a second supply voltage higher than the first supply voltage.

Claim 23 (Currently Amended): A laser modulating and driving device comprising:  
a pixel data generating unit configured to produce pixel data and formed in a first substrate;

a modulation signal generating unit configured to generate a low-voltage laser modulation signal consisting of a pair of small swing differential signals from the pixel data, the modulation signal generating unit formed in the first substrate together with the pixel data generating unit and the pair of symmetrical small swing differential signals swinging between a predetermined high voltage and a predetermined low voltage, wherein the predetermined high voltage is less than a supply voltage of a small swing differential signal output circuit of the modulation signal generating unit, and the predetermined low voltage is more than a ground voltage of the small swing differential signal output circuit and less than the predetermined high voltage, wherein

the modulation signal generating unit has a small swing differential signal output circuit configured to output a pair of small swing differential signals as the laser modulation signal, the driving unit has a small swing differential signal input circuit configured to receive said pair of small swing differential signals, and the signal transmission line is configured to transmit said pair of small swing differential signals, and

the small swing differential signal output circuit has a first supply voltage, and the small swing differential signal input circuit has a second supply voltage different from the first supply voltage;

a driving unit configured to drive a laser according to the laser modulation signal supplied from the modulation signal generating unit and formed in a second substrate, spatially separate and distinct from the first substrate; and

a signal transmission line connecting between the first substrate and the second substrate and transmitting the laser modulation signal.

Claim 24 (Previously Presented): The laser modulating and driving device of claim 23, wherein the first substrate and the second substrate are independent printed circuit boards (PCB) or application specific integrated circuits (ASIC).

Claim 25 (Canceled).

Claim 26 (Currently Amended): The laser modulating and driving device of claim [[25]] 23, wherein the small swing differential signal output circuit has an output-stage circuit configured by a first logic, and the small swing differential signal input circuit is configured by a second logic different from the first logic.

Claim 27 (Original): The laser modulating and driving device of claim 26, wherein the first logic is current mode logic or emitter coupled logic.

Claim 28 (Original): The laser modulating and driving device of claim 26, wherein the second logic is differential signaling using a pair of transistors.

Claim 29 (Canceled).

Claim 30 (Currently Amended): An image reproducing apparatus comprising:

- a photosensitive unit;
- a light source using a laser;
- a laser modulation signal generating unit formed in a first substrate and configured to produce a laser modulation signal consisting of a pair of small swing differential signals based on pixel data, the pair of symmetrical small swing differential signals swinging between a predetermined high voltage and a predetermined low voltage, wherein
  - the predetermined high voltage is less than a supply voltage of a small swing differential signal output circuit of the modulation signal generating unit, and the predetermined low voltage is more than a ground voltage of the small swing differential signal output circuit and less than the predetermined high voltage,
  - the laser modulation signal generating unit has an output-stage inverter or buffer using a transistor, and
  - at least one of a high potential and a low potential that defines a swing of said pair of small swing differential signals is generated by an ON resistance of the transistor;
- a driving unit formed in a second substrate spatially separated and distinct from the first substrate and configured to drive the laser according to the laser modulation signal;
- a signal transmission line connecting between the first substrate and the second substrate for transmitting the laser modulation signal to the driving unit; and
- a deflecting optical system for guiding and deflecting a laser beam emitted from the light source onto the photosensitive unit to form a latent image thereon.

Claim 31 (Previously Presented): The image reproducing apparatus of claim 30, wherein the first substrate and the second substrate are formed as independent printed circuit boards (PCB) or application specific integrated circuits (ASIC).